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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/660,813	09/13/2000	Ajit Dubhashi	IR-1785 (2-2408)	8167

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EXAMINER

NGUYEN, VINH P

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/660,813	Applicant(s) DUBHASHI ET AL.	
	Examiner VINH P NGUYEN	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-15 is/are allowed.
- 6) ☒ Claim(s) 16-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 16-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Needham et al (pat # 5,570,034).

As to claims 16-17, Needham et al disclose in figure 4 a CMOS with a current sense structure having a substrate (447), an elongated current conductor (401) being disposed adjacent an edge portion of the substrate (447) and a magnetic field transducer (Hall effect device "403") mounted on a surface of the substrate (447) for inducing an output therefrom related to the current in the conductor. It is noted that Needham et al do not mention about the printed circuit board as a part of the current sense structure. However, it appears that the substrate (447) would be qualified as "a printed circuit board" because it has printed circuit traces on its surface. Furthermore, the term "printed circuit board" is a broad term, therefore, any substrate with printed electrical traces on its surface would be equivalent to the printed circuit board.

3. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (Pat # 5,436,557) in view of Needham et al (pat # 5,570,034).

As to claims 16-18, Erickson discloses in figure 1 a current sensor having a printed circuit board (14) with an edge portion and a slot for an elongated conductor extending therethrough, a Hall magnetic field transducer (24) mounted to a surface of the board (14) and a magnetic body (20) disposed adjacent to the transducer (24). Erickson does not mention that the elongate conductor is from a power semiconductor device. However, Needham et al teach that it would have been well known in the art to sense the current flowing through an elongate conductor (401) of a power semiconductor device (CMOS) as shown in figure 4. It would have been well known for one of ordinary skill in the art to consider that the device of Ericson is used for measuring a current in an elongate conductor of a power semiconductor device as taught by Needham et al.

As to claim 19, Erickson disclose at least one magnetic body (20) disposed adjacent to the transducer and in line with the magnetic field of the elongated conductor to increase the magnetic flux intercepted by the transducer (24).

Claims 1-15 have been allowed since the prior art does not disclose a current sensing structure for a power semiconductor device having a power semiconductor device with its power electrode connected to an elongated conductive terminal electrode, a printed circuit board with a magnetic field transducer (Hall sensor) disposed adjacent to an edge portion, a control circuit connected to a control electrode of the semiconductor through the elongated conductive terminal

electrode for controlling current flowing in the semiconductor device.

In claim 1, lines "said printed circuit board having an edge portion;" should be deleted since it is a redundant limitation.

In claim 16, line 5, should "current sensor" be "transducer"; line 6, should "printed circuit device" be "printed circuit board".

4. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rippel (pat # 5,041,780) discloses integrated current sensors.

Ziebir et al (Pat # 5,627,398) disclose Hall effect sensor incorporated in a CMOS integrated circuit.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VINH P. NGUYEN whose telephone number is (703) 305-4914.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4900.


VINH P. NGUYEN
PRIMARY EXAMINER
ART UNIT 2829
07/01/03